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ABSTRACT

This paper reports on first-year results for an evaluation of the New York School Choice Scholarships Foundation program, which was designed to provide scholarships for children from low-income families currently attending public schools to transfer to private schools. Families won scholarships through a lottery. Researchers examined data from scholarship and nonscholarship students' scores on the Iowa Test in Basic Skills in reading and mathematics and from parent/caretaker surveys regarding their children's school experiences. Results indicated that after 1 year, students who received scholarships scored higher in math and reading; parents of scholarship users were much more satisfied with their children's education; scholarship students were being educated in smaller schools and classes and were being asked to do more homework; parents of scholarship students reported more frequent school communications; 75 percent of those offered scholarships used them; and families of scholarship applicants were similar to those eligible for participation in terms of income, but were more likely to be dependent on governmental assistance and to be African American. (SM)

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Education Policy and Governance

An Evaluation of the New York City School Choice Scholarships Program: The First Year

by

Paul E. Peterson, David Myers and William G. Howell

PEPG98-12

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An Evaluation of the New York City:
School Choice Scholarships Program: The First Year

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An Evaluation of the New York School Choice Scholarships Program: The First Year

(Executive Summary)

The School Choice Scholarships Foundation (SCSF) announced in February 1997 that it would provide 1,300 scholarships so that children from low-income families currently attending public schools could transfer to private schools. The scholarships were worth up to $1,400 annually and could be redeemed for at least three years at both religious and secular schools. SCSF received initial application forms from over 20,000 students between February and late April 1997. Scholarship recipients were selected in a lottery held in May 1997 and began school the following fall.

In this paper we report the first-year results for an evaluation of the SCSF program. The evaluation takes advantage of the fact that the SCSF lottery allowed for the conduct of a natural randomized experiment, in which students were allocated randomly to scholarship and control groups.

Our major findings from a survey of scholarship parents and students, as compared to a similar group of families in the control group, are as follows:

Outcomes:

- After one year, students who received a scholarship scored higher in math and reading tests. Overall, the differences between all those in grades two through five who used their scholarships to attend a private school and the control group of students were small—around two percentile points in both subjects. However, sizeable differences were observed among those students who were in the fourth and fifth grades—four percentile points in reading and six points in math.

- Parents of scholarship users are much more satisfied with their children's education. Nearly half the scholarship users give their school an "A", as compared to only one-eighth of the control group. Scholarship families were substantially more satisfied than the control group with every dimension of school life about which they were asked. For example, over half of the scholarship parents were very satisfied with the academic quality of the school, as compared to one-sixth of the control group. Similarly, 49 percent of the scholarship parents expressed the highest satisfaction with "what's taught in school," as compared to 19 percent of the control group. Scholarship students in third, fourth, and fifth grade are less likely to give it a failing grade.

- Parents reported that scholarship students attended smaller schools and were being educated in smaller classes. On average, the schools attended by scholarship students had 110 fewer students than the schools attended by

students in the control group. Furthermore, the classes in which scholarship students were being taught had two fewer students on average than the classes attended by the control group. Consistent with these findings, 36 percent of the scholarship parents reported being "very satisfied" with the class size at their school, but only 13 percent of the control group of parents reported a similar level of satisfaction.

- Scholarship students were less likely than the control group to have access to a library, cafeteria, nurse's office, child counselors and special programs for non-English speakers and students with learning difficulties.

- As compared to those in the control group, parents of scholarship students were more likely to report that the following were *not* a serious problem at their school: students destroying property, being late for school, missing classes, fighting, cheating, and engaging in racial conflict. Twenty two percent of the parents in the control group were very satisfied with school safety, but almost half of scholarship parents were.

- Scholarship students were asked to do more homework, parents say. Fifty-one percent of the scholarship parents reported that their child had at least an hour of homework a day, as compared to 36 percent of the control-group parents. Sixteen percent of the control group of parents but only 10 percent of the scholarship parents reported that homework was too easy. Scholarship students were more likely than control-group students to report having difficulty with homework but were less likely to say their work was marked and returned to them.

- Parents of scholarship students report more frequent school communications from their child's school and from their child's teachers.

- Scholarship students are considerably more likely than the children in the control group to be subject to a dress code and to be required to wear a school uniform; they are less likely to be required to obtain a "hall pass" when leaving the classroom.

- Student mobility rates among schools within the school year are the same for the scholarship students and the members of the control group.

- Expulsion and suspension rates were low for both scholarship students and members of the control group. No difference between the two groups was detected.

- Using a scholarship reduced somewhat the racial isolation of minority students. Eighteen percent of scholarship parents replied that less than half of those in their child's classroom were of minority background, while just 11 percent of the parents in the control group gave this response. Conversely, 37

percent of the control-group parents said all the students in the classroom were minority, as compared to just 28 percent of the scholarship parents.

- Parental self reports of their involvement in school and engagement in the education of their children was very high and much the same for both scholarship parents and those in the control group.

Making Use of a Scholarship Offer:

- Seventy-five percent of those offered scholarships made use of them. Families who made use of the scholarships were of somewhat higher income than those who did not. The expense of a private school was the most frequently given reason for not using a scholarship. Failure to pass an admissions test was hardly ever mentioned.

- Over 75 percent of the parents of scholarship users said that among the reasons "very important" for their choice of school were school safety, academic quality, what was taught in school, and school discipline. The school's location, the children's friends, and the sports program were least frequently mentioned as very important. Religious instruction was mentioned as very important by approximately half the parents.

- Thirty-four percent of scholarship parents said that, apart from their SCSF scholarship, they relied on family income to help pay for their private-school tuition. Twenty-two percent of the parents said their child had received a school scholarship, and 6 percent reported that they the school paid for some or, in a few cases, all of their remaining tuition. Sixteen percent of the respondents indicated that relatives and friends helped out.

Participation in the Program:

Families of scholarship applicants were similar to those eligible for participation in terms of income. However, they were more dependant on governmental assistance and more likely to be African American. On the other hand, mothers of scholarship students had more education and were more likely to report working full-time.

This is the first opportunity to estimate the impacts of a school choice pilot program by means of an evaluation that has all the following characteristics:

- a lottery that allocated scholarships randomly to eligible applicants;

- a lottery that was administered by an independent evaluation team that can guarantee its integrity;

- baseline data on student test performance and family background characteristics that were collected from a high percentage of the students and their families prior to the lottery;

- data on a broad range of characteristics that were collected from a high percentage of the test group and control group one year later.

An Evaluation of the New York School Choice Scholarships Program:

The First Year

Over the past few years, legislative proposals have been introduced in Congress and many state legislatures. These proposals would offer families vouchers or scholarships so that they may choose among a wide range of schools, public and private, religious and secular. In 1990 a pilot program giving public students access to secular private schools in the City of Milwaukee was enacted by the Wisconsin legislature; in 1996 the legislature expanded this program to include religious schools. After surviving a constitutional challenge in state courts, the program went into effect in the fall of 1998. A similar program enacted for Cleveland by the Ohio legislature is beginning its third year of operation in the fall of 1998. At the federal level, a pilot program for the District of Columbia received congressional approval in 1998 but was vetoed by President Bill Clinton.

Many interest groups, political leaders and policy analysts have debated the desirability of continuing and expanding these school choice programs. Supporters of school choice assert that:

- low-income, inner-city children learn more in private schools;
- a more orderly educational climate in private schools enhances learning opportunities;
- private schools use their limited resources more efficiently;
- families develop closer communications with schools they themselves choose;
- school choice reduces the amount of mobility from school to school both within the school year and from one year to the next;
- choice fosters racial and ethnic integration.[1]

These claims are challenged by school choice critics who argue that:

- any perceived learning gains in private schools are due to the more selected nature of private-school families;
- private schools select out the "best and the brightest," leaving behind the disadvantaged;
- private-school rules, such as uniforms and dress codes, interfere with a child's creativity;

- low-income families choose schools more on the basis of location, religious affiliation, and sports programs than educational quality;

- public schools have a broader range of programs to serve needy populations;

- when choices are available, mismatches often occur and private schools expel problem students, adding to the instability of the education of children from low-income, inner-city families;

- private schools balkanize the population into racially and ethnically homogenous educational environments.[2]

Much of the debate over school choice has acquired a particularly intense tone in part because high-quality information about school-choice programs is limited. Although many studies comparing public and private schools have been published, they have been criticized for comparing dissimilar populations. Even when statistical adjustments are made, it remains unclear whether findings actually describe differences between public and private schools or simply differences in the kinds of students and families attending them.[3]

The best way to make sure that two populations are similar is to assign individuals randomly to treatment and control groups. This procedure is standard in medical research. It has also been used recently in a number of educational studies, such as the Tennessee Star study that found that smaller classes had positive effects among students in kindergarten and first grade.[4] Until now, this type of research design has not been used carefully to study the question of school choice.

In this paper we report outcomes from a randomized experiment made possible by the New York School Choice Scholarships Foundation (SCSF), a privately-funded school choice program.[5] The program provides the first opportunity to estimate the impacts of a school choice pilot program that has the following characteristics:

- a lottery that allocated scholarships randomly to applicants;

- a lottery that was administered by an independent evaluation team that can guarantee its integrity;

- baseline data on student test performance and family background characteristics that were collected from a high percentage of the students and their families prior to the lottery;

- data on a broad range of characteristics that were collected from a high percentage of the test group and control group one year later.

In this report, we provide information on the SCSF program one year after students started using their school-choice scholarships. Similar reports are planned for at least the next two years of the program.

Our major findings, in summary form, are as follows:

Outcomes:

- After one year, students who received a scholarship scored higher in math and reading tests. Overall, the differences between all those in grades two through five who used their scholarships to attend a private school and the control group of students were small—around two percentile points in both subjects. However, sizeable differences were observed among those students who were in the fourth and fifth grades—four percentile points in reading and six points in math.

- Parents of scholarship users are much more satisfied with their children's education. Nearly half the scholarship users give their school an "A", while only one-eighth of the control group does. Scholarship families were substantially more satisfied than the control group with every dimension of school life about which they were asked. For example, over half of the scholarship parents were very satisfied with the academic quality of the school, as compared to one-sixth of the control group. Similarly, 49 percent of the scholarship parents expressed the highest satisfaction with "what's taught in school," as compared to 19 percent of the control group. Scholarship students in third, fourth, and fifth grade are less likely to give it a failing grade.

- Parents reported that scholarship students attended smaller schools and were being educated in smaller classes. On average, the schools attended by scholarship students had 110 fewer students than the schools attended by students in the control group. Furthermore, the classes in which scholarship students were being taught had two fewer students on average than the classes attended by the control group. Consistent with these findings, 36 percent of the scholarship parents reported being "very satisfied" with the class size at their school, but only 13 percent of the control group of parents reported a similar level of satisfaction.

- Scholarship students were less likely than the control group to have access to a library, cafeteria, nurse's office, child counselors and special programs for non-English speakers and students with learning difficulties.

- As compared to those in the control group, parents of scholarship students were more likely to report that the following were *not* a serious problem at their school: students destroying property, being late for school, missing classes, fighting, cheating, and engaging in racial conflict. Twenty two

percent of the parents in the control group were very satisfied with school safety, but almost half of scholarship parents were.

- Scholarship students were asked to do more homework, parents say. Fifty-one percent of the scholarship parents reported that their child had at least an hour of homework a day, as compared to 36 percent of the control-group parents. Sixteen percent of the control group of parents but only 10 percent of the scholarship parents reported that homework was too easy. Scholarship students were more likely than control-group students to report having difficulty with homework but were less likely to say their work was marked and returned to them.

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- Seventy-five percent of those offered scholarships made use of them. Families who made use of the scholarships were of somewhat higher income than those who did not. The expense of a private school was the most frequently given reason for not using a scholarship. Failure to pass an admissions test was hardly ever mentioned.

- Over 75 percent of the parents of scholarship users said that among the reasons "very important" for their choice of school were school safety, academic quality, what was taught in school, and school discipline. The school's location, the children's friends, and the sports program were least frequently mentioned as very important. Religious instruction was mentioned as very important by approximately half the parents.

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Participation in the SCSF program:

Families of scholarship applicants were similar to those eligible for participation in terms of income. However, they were more dependent on government assistance and more likely to be African American. On the other hand, mothers of scholarship students had more education and were more likely to report working full-time.

In the remainder of this report, we describe the program sponsored by the SCSF, the data collection, analysis and reporting procedures that the evaluation team employed, and detailed findings from the evaluation for the first year of the program.

Description of the School Choice Scholarships Foundation Program

In February 1997 SCSF announced that it would provide 1,300 scholarships worth up to $1,400 annually for at least three years to children from low-income families currently attending public schools. The scholarship could be used to help pay the cost of attending a private school, either religious or secular. SCSF received initial application forms from over twenty thousand students between February and late April 1997.

In order to become eligible for a scholarship, children had to be entering grades one through five, live in New York City, attend a public school at the time of application, and come from families with incomes such that they qualified for the U. S. government's free school lunch program. To ascertain eligibility, students and an adult member of their family were asked to attend verification sessions during which family income and their child's public-school attendance was documented.

Because of the large number of families submitting initial application forms, it was not feasible to invite all families to verification sessions. To give all families an equal chance of participating, a preliminary lottery was used to determine which families would be invited to verification sessions. Only families who attended the sessions and documented their eligibility were included in the final lottery.

The final lottery was held in mid-May 1997. Mathematica Policy Research (MPR) administered the lottery; SCSF announced the winners. Within the parameters established by SCSF, all applicants had an equal chance of winning the lottery. SCSF decided in advance to allocate 85 percent of the scholarships to applicants from public schools whose average test scores were less than the citywide median. Consequently, applicants from these schools, who represented about 70 percent of all applicants, were assigned a higher probability of winning a scholarship. In the information reported in the tables, results have been adjusted by weighting cases differentially so that they can be generalized to all applicants who would have come to the verification sessions had they been invited, regardless of whether or not they attended a low-performing school.

Subsequent to the lottery, SCSF assisted families in finding private school placements. In mid-September 1997, SCSF reported that places had been found and recorded at some 225 private schools for 1,168 scholarship recipients, approximately 75 percent of all those offered scholarships.

Evaluation Procedures

The evaluation procedures that were utilized conform to those used in randomized experiments. Baseline data were collected prior to the beginning of the scholarship program; one of the conditions for participating in the program was agreement to provide confidential baseline and follow-up information. Responses were obtained one year later from ~~83~~ 91 percent of all families participating in the evaluation.[6]

Collection of Baseline Data

During the sessions at which eligibility was verified, students were asked to take the Iowa Test in Basic Skills (ITBS) in reading and mathematics. Students in kindergarten applying for a scholarship for first grade were exempted from this requirement. Parents were asked to fill out questionnaires reporting information on their satisfaction with the school their child was currently attending, their involvement in their child's education, and their demographic characteristics. These sessions took place during March, April, and early May 1997 on Saturday mornings and on vacation days. The sessions were held at private schools, where students could take tests in a classroom setting. In most cases, private school teachers served as proctors under the overall supervision of the staff of Mathematica Policy Research (MPR).

While the child was taking a test that took more than an hour, responses to questionnaires were completed in a separate room by the adult accompanying the child to the testing session. This procedure had the advantage of giving administrators the opportunity to stress that responses to the questionnaire would be held in strict confidence and used for statistical purposes only. It also provided respondents the time to complete the questionnaire at leisure and the opportunity to ask any questions

concerning the meaning of particular questions. Questionnaires were available in both English and Spanish.

Anticipating that a variety of caretakers might be accompanying children, questions were designed in such a way as to allow any caretaker familiar with the child's school experiences to respond to the questions. Although grandmothers and other relatives and guardians also filled out the questionnaire, in over 90 percent of the cases one of the parents answered the questions. The remainder of the report, for ease of presentation, refers to opinions expressed as those of parents.

In November 1997 MPR and the Harvard Program on Education Policy and Governance (PEPG) issued a report that provided information on baseline test scores and demographic characteristics of applicants, scholarship winners, those who used their scholarships, and those who did not. Because scholarships were allocated by a lottery, there were few differences between scholarship recipients and non-recipients; however, baseline test scores of non-recipients were somewhat higher (see appendix). Those scholarship recipients who made use of the scholarship were more educated and were somewhat less disadvantaged in other respects than those who did not make use of the scholarship; however, those making use of the scholarship were more likely to be African American. Baseline test scores did not differ significantly between those using the scholarship and those who did not.[7]

Collection of First-Year Follow-up Information

To evaluate the effects of the scholarship on students and their families, MPR selected at random students from 1,000 families who had received a scholarship and 960 families who had attended a verification session but had not received a scholarship. Procedures used to select the control group are described elsewhere.[8] In April, May and June of 1998, these families were invited to attend sessions during which students took the ITBS in mathematics and reading, and adult members of their family completed surveys that asked a wide range of questions about the educational experiences of their oldest child within the age range eligible for a scholarship. Students in grades three, four and five were also asked to complete short questionnaires. (See appendix for questionnaires).

Testing and questionnaire administration procedures were similar to those that had been followed one year previously. Both the scholarship students and students in the control group were tested in locations other than the school they were currently attending. Each student's performance was given a national percentile ranking that varies between one and one hundred. The national average is fifty.

Eighty-three percent of those selected for participation agreed to attend the testing and questionnaire sessions held in April and May 1998. This high response rate was achieved in part because SCSF conditioned the renewal of scholarships on participation in the evaluation; non-scholarship winners selected to become members of the control group were compensated for their expenses and told that they could automatically reapply

for a new lottery if they participated in these follow-up sessions. The appendix compares the characteristics of respondents and non-respondents.

Data Analysis and Reporting Procedures

The analysis of the data from the first year of the SCSF program takes advantage of the fact that a lottery was used to award scholarships. As a result, it is possible to compare two groups of students that were similar, on average, in almost all respects except that the members of the control group were not offered a scholarship.

Since some families did not participate in the testing and questionnaire administration sessions held in the spring of 1998, some departure from an ideal randomized experiment occurred. However, as is discussed in the Appendix, the response rate was unusually high, especially in light of the fact that data were being collected from a low-income, inner city population in the nation's largest city. We have made adjustments in the weight given to individual cases in order to take into account differential response rates.[9]

This report provides data that help to answer the following two questions, both of which have clear policy implications:

1. What was the impact of the *offer* of a SCSF scholarship to a group of low-income scholarship applicants, as measured by test scores and as perceived by the applicants themselves?

2. What was the impact of *participation* in the SCSF program on those families who made use of their scholarship to attend a private school?

The analytical techniques needed to answer each question differ in important ways. The first question can be answered straightforwardly by comparing the responses of those who were offered a scholarship with the responses of the control group. Because scholarships were awarded at random, the two groups may be assumed to be, on average, statistically equivalent, save the offer of a scholarship. Any differences between the two groups can be attributed to the offer.[10]

To compute program impacts on children's test scores, we estimated a statistical model that took into account students' scholarship or control-group status, baseline reading and math test scores, and variables used to define the randomization process. Baseline test scores were included to: 1) adjust for baseline differences between the treatment and control groups on the achievement tests and 2) to increase the precision of the estimated impacts.[11] To compute program impacts on the parent and student survey outcomes we used a similar approach; however, we did not include the baseline test scores to predict parent and student responses.

The answer to the first question is provided in columns one and two of many of the tables in this report (Tables 5-18). Column one of these tables provides the responses of those offered a scholarship; column two is the difference in the responses of those offered a scholarship and a control group. Subtracting column two from column one generates the responses of the control group.

For some policy analysts, this first question is the crucial policy question: What happens when a school choice program is put into effect? What are the impacts on the population of low-income families who were interested in a school-choice scholarship? This is similar to a question often asked in medical research: What will happen if a particular pill is marketed? How will the health of potential users be altered, whether or not all patients use the pill as prescribed?

But other analysts want an answer to question two as well. They want to know what are the consequences of actually participating in the program, that is, making use of the scholarship and attending a private school. More exactly, they want to know what difference it makes whether low-income, inner-city families attend a public or a private school. In medical research, the parallel question is: What are the consequences of actually taking a pill, as prescribed?

The answer to this second question requires a comparison between scholarship users and similar individuals in the control group.[12] Column three provides the responses of scholarship users and column four the difference between users and the responses of those members of the control group who, it is estimated, would have used the scholarship.

In short, when we provide information that answers the two questions enumerated above, we present the information in four columns, as follows:

1. Response of all those offered a scholarship.
2. Estimated impact of being offered a scholarship.
3. Responses of all those who made use of a scholarship.
4. Estimated impact of using a scholarship.

Control Group

The impact of program participation, as estimated in column four, is still subject to possible error. Ten percent of the control group placed their students in private schools, despite the fact that the family did not receive a New York School Choice Scholarship. Instead, they found an alternative way of financing a private education. As a result, the scholarship parents are being compared to a control group that also contains a number of families with children in private schools, making the estimates of programmatic impacts reported below conservative indications of differences between public and private schools in New York City.[13]

Response Bias

It is well known that people tend to over-estimate their good behaviors and under-estimate their less attractive ones. Very likely, we are more likely to over-estimate our smiles than our frowns, our vitamin than our fat intake, our minutes spent in exercise than those spent as a couch potato.

Students and parents are no different. They are likely to over-estimate the time spent at homework, volunteering for school, and educational expectations for their child. Parents may also view the school their child attends through rose-tinted glasses; after all, few responsible parents are likely to admit to themselves or to others that they are sending their child to a terrible school.

The interpretation of data from the parental and student surveys in New York City needs to take into account this very human tendency. No special weight should be placed on the actual frequency with which any particular type of event is said to take place. For example, one should not take too seriously the claim by children in third through fifth grade that they spend, on average, approximately one hour and twenty minutes a day doing their homework.

But if absolute levels may not be estimated accurately, there is no reason to believe that the two groups of parents—scholarship recipients and members of the control group—differ in the accuracy of their reports. After all, individuals were assigned randomly to the two groups, and any reporting bias should be similar for the two groups. Thus, this report will interpret differences between groups rather than the absolute value obtained by any one group.

Generalization of Findings

One must qualify any generalizations from the results of this pilot program to a large-scale voucher program that would involve all children in New York City or other central cities. Only a tiny fraction of low-income students in New York public schools were offered scholarships, and they constituted only a small proportion of the students attending New York private schools. The impact of a much larger program could conceivably have quite different program outcomes.

The positive outcomes reported herein nonetheless may prove encouraging to those who seek to extend and expand school choices for low-income, inner-city families. It is hoped that careful research will accompany larger pilot programs established by private philanthropists and/or public authorities.

Participation in Scholarship Program

Critics of school choice have argued that choice programs do not give low-income families a viable choice of schools. In the words of educational sociologist Amy Wells,

"White and higher-SES [socio-economic status] families will no doubt be in a position to take greater advantage of the educational market."[14] Defenders of private schools have replied that private schools have an ethnically and economically diverse population. For example, they have said that the social composition of Catholic schools in New York City does not differ substantially from that of public schools.[15]

Applying for a Scholarship

To be eligible to apply for a scholarship, a family had to qualify for the federal free lunch program, have a child currently in a public school, and live in New York City. To have one's name entered into the lottery, applicants had to participate in eligibility verification sessions at which their children were tested and parents filled out questionnaires. It is possible that the application process attracted a population substantially different from a cross-section of all those eligible.

To estimate the extent to which the applicant population differed from a cross-section of the population, Rachel Deyette at Harvard's Kennedy School of Government obtained demographic information on the population that would have been eligible had scholarships been offered in 1990, the last year in which a U. S. census was taken.[16]

Her estimate is based on data collected at a time in which New York's economic and social conditions differed from those prevailing at the time parents were surveyed. For one thing, 1990 was a recession year, and 1997, the year of application, was in the midst of a boom. Also, education levels of the adult population have risen. Nonetheless, Deyette's data provide a useful estimate of the extent to which the applicant population differs from those eligible.

Deyette finds no significant difference in the income of applicants as compared to the eligible population, once income is adjusted for inflation between 1990 and 1997 (see table 1). Father employment rates are similar. Also, the residential mobility of the applicant population is about the same as among the eligible population. And applicant mothers are only slightly more likely to be foreign born than is the eligible population.

Applicants were more likely to be dependent on government assistance for income. Also, the applicant population is less likely to be non-Hispanic white and more likely to be African American. If these findings suggest that the applicant population was particularly disadvantaged, other findings point in the opposite direction. Mothers and fathers are considerably more likely to have some college education, English is more likely to be the language spoken in the household, and mothers are more likely to be employed either full or part-time.

Selecting a School

School critics often disagree with proponents of school choice about the importance of educational considerations in the selection of the school. Critics argue that low-income families are more concerned about location, sports programs, or religious instruction than about academic quality per se. For example, the Carnegie Foundation for the Advancement of Teaching has claimed that "when parents do select another school, academic concerns often are not central to the decision."[17] Similarly, an American Federation of Teachers' report on the Cleveland voucher program suggests that parents sought scholarships, not because of "'failing' public schools" but "for religious reasons or because they already had a sibling attending the same school."[18] Public intellectual Nicholas Lemann makes the point most provocatively: When a major impediment to the achievement of poor children is "their parents' impoverishment, poor education, lax discipline, and scant interest in education," he asks, isn't it absurd to think that these same parents will become "tough, savvy demanding education consumers" once they have the right to choose?[19] Disputing these contentions, supporters of school choice claim that low-income parents, like other parents, place the highest priority on the educational quality of the school.

To ascertain the considerations New York parents had in mind when selecting a school, parents were asked how important was the academic quality of the school, class size, safety, availability of religious instruction, the sports program, and several other dimensions that are often thought to be of interest. Parents were also given the option of saying the school selected "was the only choice available."

School safety, "what's taught in class," teacher quality, academic quality and discipline were the most frequently mentioned factors cited as "very important" to scholarship users. Over three-fourths of the scholarship users ticked off the "very important" box after these five items (Table 2). The items least frequently mentioned as "very important" to scholarship users were attending a neighborhood school, a child's friends, and the sports program. Only about a quarter of the parents checked these items as "very important." Approximately half of the parents said religious considerations were very important.

Obtaining the School of Choice

Most parents of scholarship users in New York report that they were able to send their child to a preferred private school. Despite the fact that scholarships were not awarded until May 1997, just a couple of months prior to the end of the previous school year, over 72 percent of those offered a scholarship reported success in finding a school they wanted (Table 3).[20] Surprisingly, fully 60 percent of the families in the control group also said their children went to a desired school. While these differences are statistically significant, they are not very large, suggesting that being offered a scholarship may not greatly affect families' chances of sending their children to schools they consider acceptable.

Those who did not obtain the school of their choice were asked what they thought were the reasons why. Parents were invited to list more than one reason, if they wished. The most common reason given by parents offered the scholarship was that the family could not afford one of their preferred schools, a response given by 14 percent (Table 3). Other reasons mentioned by families included the following: the family had applied too late, the child was not given a space, and/or no space was available at the school. Each of these factors was listed by somewhat less than 7 percent of all those offered a scholarship. Transportation and inconvenient location were each given as a reason by about 2 percent. Only a few parents gave other reasons, such as failure to pass the admission test, family not being a member of the church affiliated with the school, or communication problems.[21]

Paying for School

Most families who accepted an SCSF scholarship needed to find additional resources to pay the tuition at their child's private school. To find out where families obtained additional resources, we asked scholarship parents how they paid the tuition. When responding to this question, parents were invited to list more than one source of revenue, if appropriate. Eighty-three percent said they received and used a SCSF scholarship (Table 4), but according to SCSF records the other 17 percent received the scholarship as well.[22]

Other than an SCSF scholarship, the most frequently mentioned source of tuition revenue is family income, a source mentioned by 34 percent of the scholarship users. Twenty-two percent of these parents said their child had received a school scholarship, and 6 percent said they the school paid for some or, in a few cases, all of their tuition. Sixteen percent of the respondents said that relatives and friends helped out. Only 4 percent said they paid for tuition by donating time and fund-raising support.

Experiences in School

The effect on students of attending a private school has been a matter of considerable debate. Critics of school choice argue that choice will lead to ethnic and racial segregation,[23] while supporters reply that the private sector is more integrated than the public sector.[24] Critics say that many private schools do not give students the necessary freedom to develop broadly, while supporters say that privately run schools are more orderly, making it easier for children to learn. Choice critics say that public schools have better facilities and more elaborate programs capable of serving a diverse population.[25] Choice supporters claim that private schools have necessary facilities and do a better job of incorporating all children into a common framework.

These topics are often debated with limited, low-quality information. In this section we provide, for the first time, information from a randomized experiment on school facilities, program, ethnic composition, and the disciplinary climate in public and private schools.

School Facilities

Most observers expect to find in central-city public schools larger, more expensive, more complex, and more sophisticated facilities than are available in central-city private schools. With a few exceptions, reports from applicant parents in New York City are consistent with the conventional wisdom.

First of all, public schools are larger. As estimated by parents, the effect of taking a scholarship was to reduce the size of the school a child attended by 110 students (Table 5). Private schools attended by scholarship recipients were also less likely to have a library, a cafeteria, a nurse's office, child counselors, and special programs for non-English speakers and students with learning programs. The biggest difference was for programs for non-English speaking students. Fifty-five percent of the scholarship parents reported such a program in their school, as compared to three-quarters of the control-group parents. Most other differences were not as large; for example, almost 83 percent of the scholarship families reported their school had a nurse's office, as compared to 93 percent of the parents in the control group (Table 5).

In a couple of instances, private school parents reported more extensive facilities and programs. For example, they were somewhat more likely to say their school had a computer laboratory and a music program. In other cases such as programs in arts, programs for advanced learners, and after-school programs, no differences between the two groups were evident.

Private school parents also reported that their children were in smaller classes. As estimated by parents, the effect of using a scholarship was to reduce the size of the child's class by 2.1 students (Table 5). Inasmuch as recent research indicates that class size has important positive effects on student learning, especially among younger children, private-school supporters may interpret this as an indication that schools in the private sector use scarce educational resources more efficiently.[26]

In sum, classes and schools are smaller in the private sector, but public schools have a wider range of facilities and programs. These larger, more complex facilities do not seem to satisfy the parents who applied for scholarships, however. On the contrary, approximately 36 percent of the scholarship users were very satisfied with school facilities, as compared to less than 14 percent of the parents in the control group (Table 5).

Ethnic Composition of School

Using a scholarship in New York City slightly reduced somewhat the racial isolation of minority students. Parents were asked, "What percentage of the students in this child's classroom are minority?" To this question, 17 percent of the scholarship users replied that less than half of the students in the classroom were of minority background. Only 11 percent of the parents in the control group gave this response. Conversely, 37

percent of the control-group parents said their child's classroom was all- minority, as compared to just 28 percent of the parents of scholarship users (Table 6).

Special Education

In the debate over school choice, special education has received a good deal of attention. Critics of school choice say that private schools ignore the needs of those with physical and mental disabilities.[27] Defenders of school choice often claim that many of those diagnosed as disabled can learn in regular classrooms and that special arrangements can be made for others.

To illuminate this question, parents were asked about their child's special education needs and the availability of school programs to meet these needs. Only 4 percent of those offered a scholarship said their child had a physical handicap, and just 11 percent said their child had learning difficulties (Table 7). Of those with learning difficulties, scholarship users were more likely to say the facility met the child's needs very well. Nearly 50 percent of the private-school parents said they met the learning needs very well, as compared to a third of the control group of parents. The percentages for those with physical difficulties were 33 and 17 percent, respectively, though these differences were not statistically significant.

Because only a small percentage of families who applied for scholarships had special education needs, these results are hardly definitive. What can be said is that of that small percentage of families of disabled children who apply for scholarships, private schools seem as well or better equipped to meet their needs as are public schools. At least that is what parents reported.

School Climate

The scholarship program had a major impact on the daily life of students at school, if parental reports are accurate. Scholarship parents were more likely to report that the following were *not* a serious problem at their school: students destroying property, being late for school, missing classes, fighting, cheating, and racial conflict. For example, 44 percent of the parents with students in private schools thought fighting was a serious problem at their school, but nearly two-thirds percent of the control group of parents said it was (Table 8). The percentages perceiving tardiness as a problem were 38 for the scholarship user, 57 for the control group. Nearly 30 percent of scholarship users, but 44 percent of the control group, said destruction of property was a serious problem.

Although student reports of the climate in their school and classroom are not as sharply differentiated as those of parents, they are consistent with parental assessments. As can be seen in Table 8, scholarship users were more likely to report that "rules for behavior are strict," fewer of their friends use "bad language" and "students are proud to go to this school."

Public and private schools seem to use different control mechanisms for maintaining discipline. Private schools seem to emphasize dress and orderliness; public schools use rules and regulations. Almost all private schools seem to require students to wear a school uniform. No less than 97 percent of the scholarship parents reported their school required uniforms, as compared to 33 percent of the parents in the control group (Table 8). Similarly, 95 percent of the scholarship parents reported that certain kinds of clothing are forbidden, but less than half of the control group do. On the other hand, sign-in sheets and hall passes are more frequently employed by public schools. Virtually all of the control group reported that parents must sign-in when they come to school, but only four-fifths of the scholarship parents reported such a regulation. To leave their class, control-group students must obtain a hall pass, say about 86 percent of the control group parents—but only about 71 percent of the scholarship parents say this is required.

Homework

Students in private schools are asked to do more homework, parents say. Fifty-five percent of the scholarship users reported that their child had at least an hour of homework a day, whereas only 36 percent of the control-group parents reported this much homework (Table 9). Private school parents were also less likely to say the homework was too easy.

Student assessment of their homework situation varied somewhat from that of the parents. However, question-wording was sufficiently different for parents and students that the results do not directly contradict each other. Students were asked to indicate whether or not it was true that they "had trouble keeping up with the homework." Nearly 30 percent of the scholarship students said this was true, but only 22 percent of the students in the control group did (Table 9). Later on, students were asked "how much" of their homework they "usually" did. If the students are to be believed, they are model students, because about 80 percent of both groups of students claim to do "all" of their homework. Nearly half claimed their homework is "graded and returned" to them "always or most of the time." Students in the control group were more likely to say their homework is graded and returned to them "always or most of the time." The figures were 51 and 39 percent, respectively.

School Communications with Parents

Parents of scholarship users report much higher levels of communications from their school about their child. Although no significant differences in the frequency of parent-teacher conferences were reported, the data presented in Table 10 indicates that a higher percentage of scholarship users reported :

- being more informed about student grades halfway through the grading period;

- being notified when their child is sent to the office the first time for disruptive behavior;
- parents speaking to classes about their jobs;
- parents participating in instruction;
- parent open-house or back-to-school night held at the school;
- parents receiving notes about their child from the teacher;
- parents receiving a newsletter about what is going on in school;
- parents being informed by school when the child is absent.

The largest differences in school communication practices involved parents receiving newsletters, parents participating in instruction, parents receiving notes from teachers, and parents speaking about their jobs. For example, nearly 90 percent of the scholarship users reported receiving notes from teachers as compared to just over three-fourths of the parents in the control group.

Religious Practices

The SCSF program had an impact on the religious practices of the families. Parents of scholarship users reported taking their child more frequently to religious services than parents of the control group. Students who were scholarship users confirmed their parents' report. As compared to the students in the control group, scholarship users more often said they received religious instruction outside of school, participated in church youth groups and attended religious services (Table 11). About a third of the scholarship students, but only a little more than one-fifth of the control group, said they have been receiving religious instruction outside of school. Almost half of scholarship users participated in church youth groups, as compared to less than a third of the students in the control group. Finally, scholarship users had attended church services more frequently than members of the control group.

The higher level of religious activity among scholarship users was, in all likelihood, a genuine program impact, not a function of any selectivity in the population using the scholarship. It is important to emphasize once again that the award of a scholarship was made randomly, making it likely that students engaged in similar levels of religious activity prior to the beginning of the pilot program. And in fact, one year previously, when parents were asked about their religious affiliations in the in the baseline survey, no significant differences in religious affiliation between the two groups could be detected.

School-Family Relationships

Supporters of school choice claim that when parents choose a school, the family becomes more engaged in their child's education. Working together, schools and parents create a more effective educational environment for their children.[28] But choice critics argue that any observed differences in parental engagement with private schools is due to the selected nature of the families who choose private schools in the first place.

Parental Involvement in School Activities and Children's Education

The evidence after one year provides little evidence that school choice increases family engagement in their children's education. Both parents in the scholarship and the control group claim to be very active in school affairs, and, given the fact that they made the effort to apply for a scholarship, it is entirely possible that these self-reports are not greatly exaggerated. More to the point, the scholarship program seems to have little effect on parental involvement in school life.

As can be seen in Table 12, those receiving a scholarship do not differ significantly from the control group along the following dimensions: number of hours spent volunteering in a child's school, membership in the PTA or similar organization, number of hours spent as a volunteer in this school organization, or the number of times the parent talked with someone at the school about their child's schoolwork, behavior, attendance, special classes, or accomplishments.

The item on which the two groups of parents differ substantially has to do with "raising money for the school" and "volunteering to work in the school." As one might expect, private schools are more likely to enlist parents in these activities (Table 13).

Nor has the program yet had any significant impact on parental involvement in their children's education. Parents were asked how often they helped their child with homework, talked with their child, attended with their child a variety of events, such as school activities, concerts, social gatherings, the library and so forth. In every case, the answers given by the scholarship users and members of the control group were essentially the same.

Student Adjustment to Choice Schools

At least according to their survey responses, scholarship students do not seem to have serious problems adjusting to their new classmates. They reported the same average number of friends in schools as did the students in the control group. And scholarship students were no more likely to say that they often "feel "made fun of" by other students" than were the control-group students, further evidence of adaptation to the new school. However, scholarship parents do not seem to have as much information about their children's friends as they would have, had they remained in their prior school. Thirty-six percent of the control group, but just 27 percent of the scholarship students, reported that their parents knew at least four of their school friends (Table 14). One possible reason

for this difference is that all scholarship students attended new schools and most likely made new school friends, while most of the students in the control group probably remained at the same school and, presumably, maintained many pre-existing friendships.

Parental and Student Satisfaction

Most studies of scholarship or voucher programs for low-income minority families have found that families receiving the scholarships are much more satisfied with their schooling than are families who remain in public schools.[29] The results from New York confirm the earlier findings. When asked to assess their school overall, private schools receive a significantly higher grade than do public schools. The effect of the scholarship program on those who take the scholarship is to raise the parental evaluation of the school by three-fourths of a grade. Over two-fifths of the scholarship users give their school an "A", while only one-eighth of the control group do (see Table 15).

We also examined parental satisfaction with specific dimensions of school life. On every aspect of a school about which parents were questioned, scholarship parents were substantially more satisfied than parents of the control group. The percentage of parents "very satisfied" with a private school was significantly higher for all of the following: location of the school, school safety, teaching, parental involvement, class size, school facility, student respect for teachers, teacher communication with parents with respect to their child's progress, extent to which child can observe religious traditions, parental support for the school, discipline, clarity of school goals, staff teamwork, teaching, academic quality, the sports program and what is taught in school (Table 15). For example, more than half of the scholarship parents were very satisfied with the academic quality of the school, while just one-sixth of the control group were. Similarly, 49 percent of the scholarship parents expressed the highest satisfaction with "what's taught in school," as compared to 18 percent of the control group.

The scholarship program had the smallest impact on parental satisfaction with school location. One half of the scholarship parents were very satisfied with the school's location, but over a third of the control group of parents were also very satisfied. Differences between the two groups were considerably larger in every other domain.

Differences in student reports of satisfaction were in the same direction but not as large as those reported by parents. In the short questionnaire administered to those in third through fifth grade, students were asked to give an overall grade for their school. The data in Table 15 indicate that scholarship users were less likely to give failing grades of "D" and "F."

Continuing in the Program

It is generally thought that students do better if they can remain in the same school throughout the school year and from one year to the next. Does school choice destabilize a child's educational experience? In his evaluation of the Milwaukee school

choice program, John Witte said that one of his concerns was the high rate of attrition from private schools.[30] And a number of choice critics have raised questions about the readiness of private schools to expel students who do not "fit in."[31] But other studies have found that students from low-income families are more likely to remain in the same school throughout the school year and from one year to the next.[32]

The SCSF pilot program provides an opportunity to examine this question with data from a randomized experiment. In general, the findings confirm the conclusion that school choice does not disrupt the education of low-income students.

Changing Schools During the School Year

A very high percentage of all students in the study were said to have remained in the same school the entire year, much higher than is typical of inner-city minority children in general. This is probably due to the fact that the families who applied for scholarships were strongly committed to their children's education. No differences in school mobility rates are apparent between the two groups. As can be seen in Table 16, 95 percent of both the scholarship parents and those in the control group reported that their child had remained in the same school throughout the school year. Similarly, suspension rates were much the same for both groups. Six percent of the parents in the control group and 4 percent of the scholarship users reported their child had been suspended.[33]

Those who did change schools were asked to list their reasons. Among both groups, the reasons given were fairly evenly distributed across the variety of alternatives provided in the questionnaire. The most frequently mentioned reason was a move away from the school (see Table 16).[34]

In short, school mobility was very low and virtually identical for both scholarship users and members of the control group. School expulsion or suspension was a trivial factor, affecting less than one percent of each group.

Plans for Next Year

Scholarship recipients say they are more likely to attend the same school next year than are the members of the control group. More than 80 percent of the families using a scholarship said they expect their child to be back at the same school, as compared to about 78 percent of the control group (Table 17).

Approximately 5 percent of scholarship parents said they were changing schools because they did not find the quality of the school acceptable, and another 5 percent said they were planning on moving away from the school. The next most frequently mentioned reasons, given by less than 2 percent of scholarship parents, were expense and an inconvenient location. Less than one percent of all scholarship users said they had been asked by their school "not to return."

A larger percentage of the families in the control group were planning to change schools next year. Nearly one quarter of the control group expected their child to be going to a different school. However, 13 percent of those changing schools said it was because their child was graduating—presumably from elementary into middle school, a break found in New York public but not in most New York private schools. If these families are put to one side, the percentage of those in the control group thinking of changing schools is about 16 percent, about the rate among scholarship parents. Nine percent of all control-group families said the quality of their school was not acceptable. One percent of all control group members said they were changing schools because their child had been asked not to return.

Test Performance

Most school-choice experiments conducted thus far have not conformed to a classic randomized experiment. Privately funded programs in Indianapolis, San Antonio, and Milwaukee admitted students on a first-come, first-served basis. In the state-funded program in Cleveland, scholarship winners were initially selected by means of a lottery, but eventually all applicants were offered a scholarship, thereby precluding the conduct of a randomized experiment. In Milwaukee vouchers were awarded by a lottery, if schools were over-subscribed; however, the lottery was not conducted by the evaluation team and data collection was incomplete.[35]

Because of the limitations on prior research, this evaluation provides an improved opportunity to estimate the impacts on test scores of 1) an offer of a school-choice scholarship; and 2) attendance at a private school on the part of the scholarship recipient.

Results

Column two of Table 18 reports the average impact of a scholarship offer on a student's test scores in reading and mathematics for all students, for students in grades 2, 3, 4, and 5, and, to increase the number of observations, for the combined group of fourth and fifth graders. Because baseline test scores were not collected from applicants then in kindergarten, no first-grade results are reported. Column four reports the average programmatic impact on students' national percentile ranking, that is the impact on test scores of attendance at a private school by a scholarship student.

As can be seen in column two of Table 18, the estimated impact of being offered a scholarship on all students in grades two through five is small but positive in both reading and mathematics. The impact on the national percentile ranking is 1.6 in mathematics and 1.7 in reading. The impact of using a scholarship to attend a choice school is 2 percentile points in math and 2.2 percentile points in reading. These effects are statistically significant.

The picture changes noticeably when one examines the results by grade level. For grades 2, 4 and 5, the impact of being offered a scholarship on math performance varies between 3.2 and 5.4 percentile points. For reading, the impact varies between 2.7 and 5.1 percentile points. Effects in math are statistically significant for grades 2, 4 and 5, and in reading they are statistically significant for grade 5. In third grade, the estimated effects are –1.6 in math and –1.5 in reading; these effects are not statistically significant.

The impact on math of a scholarship students' attendance at a private school for one year for grades 2, 4, and 5 are 4.4, 7.0 and 4.5 percentile points respectively. The impact on reading for grade 2, 4 and 5 are 3.8, 2.8 and 5.8 points respectively. The effects on math are statistically significant for all three grades, and for reading, they are significant in fifth grade only. The effects among third graders are –2.0 points in math and –1.8 points in reading; these results are not statistically significant. We do not know why results differ for grade three.

The results for fourth and fifth grade students combined are worthy of special attention, because they are based on a larger number of observations and thus are more stable. For these students, the impact of a scholarship offer on math scores is 4.7 percentile points and on reading scores is 3.2 points. The impact of a scholarship's student attendance in a private school for the two subjects is 5.9 and 4.0 points, respectively.

Effect Size

The size of the impacts of New York's SCSF program can be assessed by comparing them to the results of an evaluation of another randomized experiment, the reduction in the average class sizes in Tennessee from approximately 25 to 15 students. In Table 19 the results from the Tennessee intervention are presented in standard deviations.

A standard deviation is a statistical measure that can be used to compare the size of programmatic impacts among different kinds of interventions, even though raw measures differ. In the case of the class size evaluation in Tennessee, no statistically significant effects were identified for students beyond the first grade. Among first graders, effect sizes varied between .15 and .30 standard deviations, as is shown in Table 19. In his comment on these effects, Mosteller has observed, "Although effect sizes of the magnitude of 0.1, 0.2, or 0.3 may not seem to be impressive gains for a single individual, for a population they can be quite substantial." Elsewhere, he observes, "an increase of one-fourth of a standard deviation can amount to a considerable gain in performance."[36] Congress has apparently been persuaded by the effect sizes observed in Tennessee. After extensive policy deliberations in which the Tennessee evaluation was frequently mentioned, Congress in 1998 enacted legislation authorizing a more than one billion dollar expenditure for the purpose of reducing the size of elementary school classes.

The effect sizes observed in this evaluation of the New York scholarship program

do not differ materially from those observed in Tennessee. While the largest effects in the class-size evaluation were observed in first grade, in this evaluation of school choice the effects that survive the most rigorous tests of statistical significance are observed in grades four and five. As can be seen in Table 19, for the two grades combined, the effects of being offered a scholarship were, on average, .18 standard deviations in math and .14 in reading. The effects of attendance at a private school were, on average, .23 and .18, not much different from the .2 to .3 effects observed in the first grade of the Tennessee Study – the only grade where incremental class size effects were even detected. Following Mosteller's guidelines, these effect sizes, observed after just one year in the program, can be said to be "quite substantial."

It is interesting to note that the significant effects of the class-size intervention occurred in first grade, while the larger and more stable effects of the school-choice intervention were observed among fourth and fifth graders. It may be that younger children benefit especially from smaller classes, while in inner cities the advantages of school choice are greater for somewhat older children. Nationwide assessments of U.S. public schools indicate that learning begins to falter after age nine.[37] Our evidence is consistent with these results.

The Tennessee study of class size found that initial gains were sustained in subsequent years, but they found no incremental gains beyond those achieved in the first year. It will be interesting to see whether the gains observed in the school-choice program's first year are sustained and/or enlarged in subsequent years. This evaluation is scheduled to continue for at least two more years.

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[1] Recent works making a case for school choice include John E. Brandl, *Money and Good Intentions are not Enough, or Why a Liberal Democrat Thinks States Need Both Competition and Community* (Washington, D. C.: Brookings 1998); Andrew J. Coulson, *Market Education: The Unknown History* (CATO Institute, forthcoming); Clifford W. Cobb, *Responsive Schools, Renewed Communities* (San Francisco, California: Institute for Contemporary Studies, 1992); and Alan Bonsteel and Carlos A. Bonilla, *A Choice for our Children: Curing the Crisis in America's Schools* (San Francisco: Institute for Contemporary Studies, 1997). A collection of essays that report mainly positive school-choice effects are to be found in Paul E. Peterson and Bryan C. Hassel, eds. *Learning from School Choice* Washington, D. C.: Brookings, 1998).

[2] Carol Ascher, Norm Fruchter, and Robert Berne, *Hard Lessons: Public Schools and Privatization* (New York: Twentieth Century Fund Press, 1996); Carnegie Foundation for the Advancement of Teaching, *School Choice: A Special Report* (Princeton, New Jersey, Carnegie foundation for the Advancement of Teaching, 1992); Amy Gutmann, *Democratic Education* (Princeton: Princeton University Press, 1987); Henry M. Levin, "Educational Vouchers: Effectiveness, Choice, and Costs," *Journal of Policy Analysis and Management* 17:3 (Summer, 1998),pp. 373-392; Bruce Fuller and Richard F. Elmore, with Gary Orfield, eds. *Who Chooses? Who Loses? Culture, Institutions, and the Unequal Effects of School Choice* (New York: Teachers College Press, 1996); E. Rasell and R. Rothstein eds., *School Choice: Examining the Evidence* (Washington, D. C.: Economic Policy Institute, 1993); Peter W. Cookson, *School Choice: The Struggle for the Soul of American Education* (New Haven: Yale University Press).

[3] Major studies finding positive educational benefits from attending private schools include James S. Coleman, Thomas Hoffer, and Sally Kilgore, *High School Achievement* (New York: Basic Books, 1982); John E. Chubb and Terry M. Moe, *Politics, Markets, and America's Schools* (Washington. Brookings 1990); Derek Neal, "The Effects of Catholic Secondary Schooling on Educational Achievement," (University of Chicago, Harris School of Public Policy and National Bureau for Economic Research, 1996). Critiques of these studies have been prepared by Arthur S. Goldberger and Glen G. Cain, "The Causal Analysis of Cognitive Outcomes in the Coleman Hoffer, and Kilgore Report," *Sociology of Education*, vol. 55 (April-July 1982), pp. 103-22; Douglas J. Wilms, "Catholic School Effects on Academic Achievement: New Evidence from the High School and Beyond Follow-up Study," *Sociology of Education*, vol. 58 (1985), pp. 98-114.

[4] Frederick Mosteller, "The Tennessee Study of Class Size in the Early School Grades," *The Future of Children* 5 (1995), pp. 113-27.

[5] We wish to thank the School Choice Scholarships Foundation (SCSF) for co-operating fully with this evaluation. This evaluation has been supported by grants from the following foundations: Achelis Foundation, Bodman Foundation, Lynde and Harry Bradley Foundation, Donner Foundation, Milton and Rose D. Friedman Foundation, John M. Olin Foundation, David and Lucile Packard Foundation, Smith Richardson Foundation, and the Spencer Foundation. We are grateful to Kristin Kearns Jordan and other members of the SCSF staff for their co-operation and assistance with data collection. We received helpful advice from Paul Hill, Christopher Jencks, Donald Rock and Donald Rubin. Daniel Mayer and Julia Kim, from Mathematica Policy Research, were instrumental in preparing the survey and test score data, and in implementing many of the analyses reported in the paper. Additional research assistance provided by David Campbell, Rachel Deyette, and Jennifer Hill; staff assistance was provided by Shelley Weiner. The methodology, analyses of data, reported findings and interpretations of findings are the sole responsibility of the authors of this report and are not subject to the approval of SCSF or of any foundation providing support for this research.

[6] The response rate for those offered scholarships was 85 ~~percent~~ 89; for the control group, it was 80 percent. The response rate for those who used the scholarship was ~~85~~ percent; for those who did not, 66 percent.

[7] See Appendix. Also, these findings are reported in Paul E. Peterson, David Myers, Josh Haimson, and William G. Howell, "Initial Findings from the Evaluation of the New York School Choice Scholarships Program," Occasional paper, Harvard Program on Education Policy and Governance, November 1997. This report is available at the website: http://data.fas.harvard.edu/pepg/

[8] Jennifer Hill, Donald B. Rubin and Neal Thomas, "The Design of the New York School Choice Scholarship Program Evaluation." Paper presented before the American Political Science Association annual meeting in Boston, MA, August 31, 1998.

[9] To adjust for non-response, we used non-response adjusted sample weights (see appendix). Since the number of missing cases is relatively small and the characteristics of the missing cases do not differ markedly from observed cases, the assumptions necessary for utilization of this procedure are not particularly restrictive.

[10] As discussed in the Appendix, differential response rates for test and control groups could account for some differences between the two groups. Since differential response rates are small, they are, for the most part, ignored in this report; however, the topic will be examined in subsequent analyses. The observed results most likely to be affected by differential response rates have to do with likelihood of remaining in school throughout the school year and returning to the same school the next year. Since non-respondents are likely to be more mobile, differences between test and control group may be under-estimated. See discussion in text below.

[11] Since all eligible children within a family could receive a scholarship, some families had two or more

children in the evaluation. The presence of multiple children from the same family produces clustering effects. When clustering is present and analyses are conducted under the assumption of simple random sampling—that is, that all observations are independent—researchers may under-estimate the standard error of the estimated impact, overestimate test statistics, and conclude inappropriately that a difference between the treatment group and the control group is statistically significant. To better approximate the true standard error, we supplemented, for test score analyses, conventional estimates with estimates using the bootstrap method (Robert Stine, 1990. "An Introduction to Bootstrap Methods: Examples and Ideas." In J. Fox and J.S. Long (Eds.), Modern Methods of Data Analysis, p. 325-373. Newbury Park, CA: Sage Publications; Bradley Effron, 1982. "The Jackknife, the Bootstrap, and Other Resampling Plans." Philadelphia, PA: Society for Industrial and Applied Mathematics). This method provides a direct estimate of the variability in the treatment impact without having to make an assumption about the independence of the observations in the sample.

Because prior research has generally found that the effects on test scores of attendance at private schools are either positive or insignificant, the one-tailed test of significance is preferred. However, in the analysis of responses by parents and children, the two-tailed test is preferred, because few prior studies exist upon which to base expectations.

[12] To compute the program's impact on those who used a scholarship, we used an instrumental variables estimator. This procedure is discussed in Joshua D. Angrist, Guido W. Imbens, and Donald B. Rubin. "Identification of Causal Effects using Instrumental Variables," *Journal of the American Statistical Association*, 91 (1996), 444-462. A brief description of the approach is presented in the appendix.

[13] If it is assumed that the impact on students in the control group who attended private schools is the same as the impact on those who made use of their scholarship, then programmatic impacts are under-estimated by about 11 to 12 percent. If one were to adjust for this under-estimate, a test score impact of 4.0 would be adjusted to about 4.5.

[14] Amy Stuart Wells, "African-American Students' View of School Choice," in Fuller and Elmore, eds., *Who Chooses?* p. 47.

[15] Blue Ribbon Panel on Catholic Schools, Report submitted to Office of the Commissioner, New York State Education Department, 1993.

[16] Rachel Deyette, "Selection into Voucher Programs: How do Applicants Differ from the Eligible Population?" Paper prepared for Program on Education Policy and Governance, Harvard University, forthcoming. Information is drawn from the Integrated Public Use Microdata Series data set of the U. S. Census, which has been created at the University of Minnesota.

[17] Carnegie Foundation for the Advancement of Teaching, *School Choice: A Special Report* Princeton, New Jersey: Carnegie Foundation for the Advancement of Teaching, 1992), p. 13.

[18] Dan Murphy, F. Howard Nelson and Bella Rosenberg, "The Cleveland Voucher Program: Who Chooses? Who Gets Chosen? Who Pays?" (New York: American Federation of Teachers, 1997), p. 10.

[19] Nicholas Lemann, "A False Panacea," *Atlantic* (January 1991), p. 104, as quoted in Abigail Thernstrom, *School Choice in Massachusetts* (Boston: Pioneer Institute for Public Policy Research, 1991), p. 40.

[20] Seventy-five percent of those offered a scholarship made use of the scholarship; some non-users also reported finding a school they wanted.

[21] Ninety per cent of those offered a scholarship but who did not use them remained in public schools.

[22] The discrepancy could be due any combination of the following: SCSF records may have been in error,

responses to the parent survey may have been inaccurate, or parents may have misperceived the source of the scholarship.

[23] Michael Kelly, "Dangerous Minds," *New Republic*, December 30, 1996: Amy Gunman, *Democratic Education*; Karl E. Taeuber and David R. James, "Racial Segregation among Public and Private Schools," *Sociology of Education* 55 (April/July 1982), pp. 103-22.

[24] Jay P. Greene, "Civic Values in public and Private Schools," in Peterson and Hassel, eds. *Learning from School Choice*, pp. 83-106.

[25] Murphy, Nelson, and Rosenberg, *The Cleveland Voucher Program*.

[26] Frederick Mosteller, "The Tennessee Study of Class Size in the Early School Grades," *The Future of Children* 5 (1995), pp. 113-27.

[27] Murphy, Nelson, and Rosenberg, *The Cleveland Voucher Program*.

[28] Brandl, *Money and Good Intentions Are Not Enough*.

[29] A summary of findings from earlier studies is available in Paul E. Peterson, "School Choice: A Report Card," in Peterson and Hassel, *Learning from School Choice*, p. 18. Mark Schneider, Paul Teske, Melissa Marschall, and Christine Roch, "Tiebout, School Choice, Allocative and Productive Efficiency," paper prepared for annual meetings of the American Political Science Association, 1998, finds higher levels of parental satisfaction within New York City public schools, when parents are given a choice of school.

[30] John F. Witte, "First Year Report: Milwaukee Parental Choice Program," University of Wisconsin—Madison, Department of Political Science and Robert M. Lafayette Institute of Public Affairs, November 1991.

[31] Murphy, Nelson, and Rosenberg, *The Cleveland Voucher Program: Who Chooses? Who Gets Chosen? Who Pays?*

[32] Jay P. Greene, William G. Howell, and Paul E. Peterson, "Lessons from the Cleveland Scholarship Program," in Peterson and Hassel, eds., *Learning from School Choice*, pp. 376-80.

[33] These percentages may underestimate the actual rate of school mobility for both scholarship students and those in the control group. The families that did not attend questionnaire administration sessions probably were more likely to have moved, making it more difficult for evaluation staff to locate them. If so, the children in those families that could not be located would be more likely to have changed schools. In this regard, it is important to note that the response rate was less for the control group than for scholarship users.

[34] Next in importance was the quality of the school, a response given by just four scholarship parents and seven members of the control group. Seven scholarship parents and four members of the control group said expense was a factor. Only three scholarship users and two members of the control group said their child had been expelled or suspended.

[35] Results from these evaluations are reported in Paul E. Peterson and Bryan C. Hassel, eds., *Learning from School Choice* (Brookings, 1998).

[36] Mosteller "The Tennessee Study of Class Size in the Early School Grades", p. 119-20. Eric A. Hanushek, "Evidence on Class Size," in Susan Mayer and Paul E. Peterson, eds., When Schools Make a Difference (Brookings, forthcoming); Frederick Mosteller, "How Does Class Size Relate to Achievement in Schools?" also in Mayer and Peterson.

[37] Though the fourth graders trailed students in Japan, Korean, the Netherlands and the Czech Republic, they did better than students in England, Norway, and New Zealand. "U. S. 4th Graders Score Well in Math and Science Study," *Education Week*, June 18, 1997, p. 22. The U. S. eighth graders clearly outscored only seven countries—Lithuania, Cyprus, Portugal, Iran, Kuwait, Columbia, and South Africa—none of them usually thought to be U. S. peers. "U. S. Students Rank about Average in 41-Nation Math, Science Study," *Education Week*, November 27, 1996, p. 32. United States National Research Center, "TIMMS High School Results Released," Michigan State University, College of Education, Report 8, April 1998. Paul E. Barton and Richard J. Coley, Growth in School: Achievement Gains from the Fourth to the Eighth Grade," Policy Information Center, Research Division, Educational Testing Service, Princeton, New Jersey, May 1998.

Table 1. Characteristics of Applicants and Population Eligible to Apply for SCSF Scholarship

	Applicants	Eligible Population
Demographic Characteristics:		
Household Income		
$0-$4,999	30.0%	28.3%
$5,000-$10,999	36.2	36.7
$11,000-$24,999	30.5	31.4
$25,000-$39,999	3.2	3.6
More than $40,000	0.1	0.0
Total	100.0%	100.0%
Average Income (1996 dollars)	$9,583	$9,538
Percent Receiving:		
Welfare	59.1%	54.1%
Social Security	12.4	5.7
Total	100.0%	100.0%
Mother's Education		
Grade 1 - 12, no H.S. grad	18.3%	54.2%
High School Grad (or GED)	27.5	26.7
Less than 2 yrs post-second.	21.7	12.4
2+ years of trade, vocational, or business school	3.8	1.7
2+ yrs academic post-second.	19.4	1.4
Bachelor's Degree	6.0	2.8
Graduate Degree	1.8	0.9
Unreported	1.5	0.0
Total	100.0%	100.0%
Father's Education		
Some High School or Below	27.7%	58.4%
High School Grad (or GED)	35.7	22.5
Some College	26.0	11.1
College Grad and Above	10.4	8.0
Total	100.0%	100.0%
Mother's Employment		
Working (full time)	20.7%	13.0%
Working (part time)	15.4	7.4
Unemploy., looking for work	47.5	8.5
Unemploy., not in labor force	16.4	71.2
Total	100.0%	100.0%
Father's Employment		
Working (full time)	46.3%	44.0%
Working (part time)	10.4	15.5
Unemploy., looking for work	26.1	12.6
Unemploy., not in labor force	17.2	27.9
Total	100.0%	100.0%

Table 1 Continued

	Applicants	Eligible Population
Mother's time at residence		
Moved in this or last year	20.5%	18.5%
Moved in more than 2 yrs ago	79.5	81.5
Total	100.0%	100.0%
Father's time at residence		
Moved in this or last year	29.7%	22.5%
Moved in more than 2 yrs ago	70.3	77.5
Total	100.0%	100.0%
Mother's Ethnicity		
African-American	44.1%	33.0%
Hispanic	47.0	53.8
White	4.7	11.8
Asian	0.9	4.7
Other	3.1	0.0
Total	100.0%	100.0%
Father's Ethnicity		
African-American	43.5%	23.6%
Hispanic	46.8	50.6
White	4.6	19.7
Asian	1.1	12.4
Other	3.9	0.0
Total	100.0%	100.0%
Percent Foreign Born Mothers		
Born outside the U.S.	38.5%	32.8%
Born inside the U.S.	61.5	67.2
Total	100.0%	100.0%
Percent Foreign Born Fathers		
Born outside the U.S.	45.7%	53.3%
Born inside the U.S.	54.3	46.7
Total	100.0%	100.0%
Language Spoken		
English	77.1%	41.6%
Spanish	20.1	48.5
Other	2.8	9.9
Total	100.0%	100.0%
(N)[1]	4619-10751	267-1070

Weighted values reported.

[1] Values of (N) are the range in the unweighted number of people who responded to specific items.

Table 2: Consideration in Choice of School

School Characteristic	Scholarship Users Say 'Very Important' (percentage)
What is taught in class	83
Teacher Quality	83
Safety	81
School Discipline	79
Academic Quality	77
Class Size	69
Religious Instruction	56
School Facility	54
Convenient Location	51
Neighborhood public school	28
Child's Friends	25
Sports Program	25
School only choice available	25
(N)[1]	664-682

Weighted values reported.

[1] Values of (N) are the range in the unweighted number of people who responded to specific items.

Table 3: Percentage of Families Whose Child Attended Preferred School

	Control Group[1] (percentage)	Scholarship Offered[2] (percentage)	Effect of Scholarship[3] (percentage)
Attended preferred school:	60	72	12***
Reason for not attending preferred school:[4]			
Could not pay school cost	23	14	-9***
No space available	5	7	2
Applied too late	1	5	4***
Transportation problems	1	4	4***
School location	1	3	1**
Child not given space	7	4	-3**
Child failed admission test	2	2	0
Not affiliated with church	1	1	1
Moved away from school	1	0	0
No reason given	1	0	-1**
(N)[5]	758	838	

Weighted values reported. * Effect of offer is statistically significant at .1 level, two tailed test; ** Effect of offer is statistically significant at .05 level, two-tailed test; *** Effect significant at .01 level, two-tailed test.

[1] All applicants not offered a scholarship. Ten percent of the control group reported placing their child in a private school; the remainder were in public school.
[2] Those who were offered a scholarship, whether or not they made use of it.
[3] Differences in outcomes between those offered a scholarship and those in control group.
[4] Parents could give more than one reason for not sending their child to a preferred school.
[5] Unweighted number of respondents.

Table 4: Sources of Money Used to Pay for School Tuition

Sources of Revenue[1]	Scholarship Users Relying Partially on this Source (percentage)
SCSF Scholarship	84%
Family income	34
Received and used school scholarship	22
Money from relatives or friends	16
School pays for some of tuition	5
Donated time and fund-raising	4
School pays for all tuition	1
(N)[2]	661-668

Weighted values reported.

[1] Respondents could cite more than one source of revenue used to pay for a child's school's tuition.
[2] Values of (N) are the range in the unweighted number of people who responded to specific items.

Table 5: Size and Quality of School Facilities

Facilities	Scholarship Offered[1]	Scholarship Offer Effect[2]	Scholarship User[3]	Programmatic Effect[4]
	(1)	(2)	(3)	(4)
Average school size:	381.3	-109.0***	352.5	-140.7***
Average class size:	24.2	-2.1***	23.6	-2.7***
Percentage v. satisfied with school facilities:	36	22***	42	28***
Percentage with the following resources:				
Special program for non-English speakers	55	-21***	48	-29***
Special programs for learning disabled	67	-12***	62	-17***
Nurses' office	83	-10***	80	-14***
Child counselor	78	-6**	76	-8**
Library	89	-5***	87	-7***
Cafeteria	91	-4***	90	-6***
Special programs for advanced learners	63	3	64	4
After-school program	91	3	92	4
Gym	92	3*	92	4**
Arts program	80	4	81	5
Computer lab	88	5**	89	6**
Music program	81	6***	83	8***
Individual tutors	61	7**	63	9**
(N)[5]	796-832		652-696	

Weighted values reported. * Effect of offer is statistically significant at .1 level, two tailed test; ** Effect of offer is statistically significant at .05 level, two-tailed test; *** Effect significant at .01 level, two-tailed test.

[1] Those who were offered a scholarship, whether or not they made use of it.
[2] Percentage of control group with a characteristic may be ascertained by calculating the difference between columns 1 and 2.
[3] Those who were offered a scholarship and identified by SCSF staff as having used the scholarship to attend a private school.
[4] Estimated effect of participation in the program, using a two-stage least squares model, as described in the Appendix. Percentage of control group with a characteristic may be ascertained by taking the difference between columns 3 and 4.
[5] Values of (N) are the range in the unweighted number of people who responded to specific items.

Table 6: Ethnic and Racial Isolation in Classroom

	Scholarship Offered (percentage)	Scholarship Offer Effect (percentage)	Scholarship User (percentage)	Programmatic Effect (percentage)
	(1)	(2)	(3)	(4)
What percentage of students in child's class are minority?				
Less than half	17	6***	18	7***
About half	21	-1	20	-1
More than half	32	2	33	3
Everyone	30	-7***	28	-9***
Total	100	100	100	100
(N)	796-832		652-696	

See notes to Table 5.

Table 7: Special Education Facilities and Programs

	Scholarship Offered (percentage)	Scholarship Offer Effect (percentage)	Scholarship User (percentage)	Programmatic Effect (percentage)
	(1)	(2)	(3)	(4)
Children with physical disabilities:	4	1	4	2
Children with learning disabilities:	11	0	11	0
Enrolled in ESL course:	8	0	8	0
Percentage who believe school doing 'very well' at attending to these needs?[1]				
Physical disabilities	28	12	33	16
Learning disabilities	42	12	47	16
ESL	69	22**	79	33**
(N)	832-837		692-695	

See notes to Table 5.

[1] These figures are calculated as a percent of those parents with disabled or non-English speaking children, not as a percent of the entire population.

Table 8: School Climate

	Scholarship Offered (percentage)	Scholarship Offer Effect (percentage)	Scholarship User (percentage)	Programmatic Effect (percentage)
	(1)	(2)	(3)	(4)
Parents report as serious problem:				
Fighting	44	-20***	39	-26***
Tardiness	42	-15***	38	-19***
Kids missing class	38	-12***	35	-15***
Kids destroy property	32	-12**	29	-15***
Cheating	35	-6**	33	-8**
Racial Conflict	32	-5*	31	-7*
Parents report on school rules:				
School uniform	82	49***	97	64***
Certain forms of dress forbidden	85	35***	95	44***
Visitors must sign in at main office	83	-11***	79	-15***
Hall passes required to leave class	74	-11***	71	-15***
(N)	817-832		676-691	
Student reports:				
Students are proud to attend this school	63	9***	66	12***
Behavior rules strict	67	5	68	6
Students get along with teachers	60	7**	62	9**
Feel 'put down' by teachers	23	-4	21	-5
Students with 4 or more friends that use bad language	19	-2	19	-3
(N)	547-578		461-487	

See notes to Table 5.

Table 9: Homework

	Scholarship Offered (percentage)	Scholarship Offer Effect (percentage)	Scholarship User (percentage)	Programmatic Effect (percentage)
	(1)	(2)	(3)	(4)
Parents reports:				
Child has more than one hour of homework	51	15***	55	19***
Homework too easy	10	-6***	8	-8***
(N)[1]	834-839		693-698	
Student reports:				
Trouble keeping up with homework	28	6*	29	7*
Did all homework	82	2	82	2
Teachers return homework most of time	42	-9***	39	-12***
(N)[2]	573-609		486-514	

See notes to Table 5.

[1] These values of (N) are drawn from the parent survey.
[2] These values of (N) are drawn from the student survey.

Table 10: School Communication With Parents

	Scholarship Offered (percentage)	Scholarship Offer Effect (percentage)	Scholarship User (percentage)	Programmatic Effect (percentage)
	(1)	(2)	(3)	(4)
Grade information:	90	8***	93	10***
Notified of disruptive behavior:	87	6***	89	8***
Parents speak to classes about jobs:	43	9***	45	12***
Parents participate in instruction:	62	12***	66	16***
Parent night:	92	5	93	6***
Regular Parent-Teacher Conferences:	93	3**	94	4**
Parents receive notes from teacher:	88	9***	91	12***
Parents receive newsletter:	82	15***	86	19***
(N)	816-831		679-693	

See notes to Table 5.

Table 11: Religious Practices

	Scholarship Offered (percentage)	Scholarship Offer Effect (percentage)	Scholarship User (percentage)	Programmatic Effect (percentage)
	(1)	(2)	(3)	(4)
Parents reports:				
Attending religious services more than once a month:	76	3	77	4
(N)	795		662	
Student reports:				
Religious instruction outside school	29	8**	30	10**
Attend religious services	60	24***	67	30***
Participate in church group	45	13***	48	17***
(N)	562-577		480-496	

See notes to Table 5.

Table 12: Parental Involvement in School

	Scholarship Offered	Scholarship Offer Effect	Scholarship User	Programmatic Effect
	(1)	(2)	(3)	(4)
Percentage of parents belonged to PTA	13%	-5%***	11%	-7%***
Average number of times talked to someone at school about the following:[1]				
Raising money for school	1.07	0.35***	1.17	0.46***
Volunteering at school	0.69	-0.18***	0.63	-0.23***
Child's schoolwork	1.98	0.09	2.01	0.12
Placing child in special classes	0.47	-0.04	0.46	-0.05
Child's accomplishments	1.70	0.15*	1.75	0.20*
(N)	772-821		640-686	

See notes to Table 5.

[1] The index is scored 0 if a parent never spoke with someone at the child's school about activity, 1 for one, 2.5 for 2 or 3 times and 4.5 for 4 or more times.

Table 13: Parental Involvement in Child's Education

	Scholarship Offered	Scholarship Offer Effect	Scholarship User	Programmatic Effect
	(1)	(2)	(3)	(4)
Average number of times parents did the following:				
Helped child with homework	5.27	-0.07	5.24	-0.09
Helped child with reading, math	4.78	-0.03	4.75	-0.04
Talked with child about school	5.61	-0.10	5.57	-0.13
Attend school activity w/ child	1.80	0.03	1.81	0.03
Worked on school projects	4.00	-0.08	3.95	-0.11
Attend concerts, movies, plays	2.84	0.11	2.87	0.14
Attended religious services	3.28	0.29**	3.35	0.38**
Attend social gathering w/ child	2.51	-0.05	2.50	-0.07
Went to restaurant with child	3.40	0.06	3.40	0.07
Spent time together	5.25	-0.02	5.23	-0.02
Went to library	4.04	0.19	4.09	0.24
(N)	784-820		651-681	

See notes to Table 5.

Table 14: Student Adjustment of Choice Schools

	Scholarship Offered (percentage)	Scholarship Offer Effect (percentage)	Scholarship User (percentage)	Programmatic Effect (percentage)
	(1)	(2)	(3)	(4)
Students with at least four friends	67	-1	67	-1
Parents who know at least four of child's friends	30	-7**	27	-9**
Students who feel "made fun of" by other students	39	-4	38	-5
(N)	576-580		485-488	

See notes to Table 5.

Table 15: Parental and Student Satisfaction With School

	Scholarship Offered	Scholarship Offer Effect	Scholarship User	Programmatic Effect
	(Percent 'Very Satisfied')			
	(1)	(2)	(3)	(4)
Parental Satisfaction:[1]				
Observe relig. trad.	42	31***	49	40***
Class size	36	23***	42	30***
Discipline	50	33***	59	43***
Academic quality	46	28***	54	36***
Student respect for teachers	50	29***	58	37***
Parental support	38	25***	43	32***
Teaching values	47	29***	55	37***
What taught in school	49	31***	58	40***
School safety	49	27***	57	36***
Teaching	54	31***	63	40***
Teacher-Parent Communication	51	25***	58	33***
Clarity school goals	39	25***	46	32***
Staff teamwork	37	22***	43	28***
Sports program	23	14***	27	19***
School facility	36	22***	42	28***
Parental Involvement	35	16***	40	21***
Location	50	16***	54	20***
Gave school an 'A'	42	27***	50	36***
(N)	803-828		672-689	
Student reports:				
Gave school an 'A'	54	6	56	7
Gave school 'D', 'F'	5	-6***	3	-8***
(N)	619		524	

See notes to Table 5.

[1] For the following measures we report the average of an index which is scored 1 for very dissatisfied, 2 for dissatisfied, 3 for satisfied and 4 for very satisfied.

Table 16: Students Changing School During School Year

	Scholarship Offered (percentage)	Scholarship Offer Effect (percentage)	Scholarship User (percentage)	Programmatic Effect (percentage)
	(1)	(2)	(3)	(4)
Suspended for disciplinary reasons:	4	-2	4	-2
Attended same school for entire school year:	95	0	95	0
Reasons why did not attend same school for entire year:				
Moved away	2	-1	1	-1
Quality of School	1	0	0	0
School too expensive	1	1**	2	1**
Suspended/expelled	0	0	1	0
Preferred public school	0	-1	0	-1
Inconvenient location	0	0	0	0
Preferred priv. school	0	0	0	0
(N)	832-842		672-681	

See notes to Table 5.

Table 17: School Matriculation Plans for Next School Year

	Scholarship Offered (percentage)	Scholarship Offer Effect (percentage)	Scholarship User (percentage)	Programmatic Effect (percentage)
	(1)	(2)	(3)	(4)
Child will attend same school next year?	80	12***	84	15***
Reasons why student not attend same school next year:				
Quality of school	5	-2	5	-2
Moving	5	-2	5	-1
Graduating	3	-11**	2	-12*
Preferred priv. school	2	0	1	0
Inconvenient location	2	0	1	-1
School too expensive	2	1**	2	1**
Children in same schl.	1	0	1	0
Asked not to return	0	0	0	0
Preferred public school	0	0*	0	0
(N)	823		684	

See notes to Table 5.

Table 18: Test Score Effects

	Scholarship Offered (percentile)	Scholarship Offer Effect (percentile)	Scholarship User (percentile)	Programmatic Effect (percentile)	(N)
	(1)	(2)	(3)	(4)	
Math:					
Grade 2	21.40	3.19* (2.44)	23.02	4.41* (3.39)	376
Grade 3	20.85	-1.63 (2.26)	20.38	-1.97 (2.74)	393
Grade 4	30.91	5.42*** (2.25)	32.64	6.97*** (2.98)	390
Grade 5	30.07	3.93* (2.64)	28.54	4.47* (3.04)	282
Grades 4 & 5	30.56	4.71*** (1.76)	31.19	5.86*** (2.21)	672
All Grades	25.36	1.58* (1.21)	25.75	2.00* (1.54)	1441
Reading:					
Grade 2	27.49	2.75 (2.35)	28.59	3.80 (3.30)	376
Grade 3	22.80	-1.50 (1.58)	23.04	-1.81 (1.91)	393
Grade 4	29.05	2.15 (1.87)	29.75	2.76 (2.40)	390
Grade 5	27.11	5.10*** (2.02)	26.74	5.81*** (2.31)	282
Grades 4 & 5	28.24	3.19** (1.36)	28.63	3.97** (1.69)	672
All Grades	26.49	1.71** (1.02)	27.00	2.16** (1.30)	1441

* significant at .1 level, one-tailed test using bootstrapped standard errors; ** significant at .05 level; *** significant at .01 level. Bootstrapped standard errors reported in parentheses. Conventional tests of significance yield the same results, except that the program effect in reading for fourth and fifth graders is significant at .05 level and for all grades, it is significant at the .1 level. Also, see notes to Table 5.

Table 19: A Comparison of School Choice and Class Size Reduction Effects on Student Test Scores

	Effects of Being Offered Treatment		Effects of Receiving Treatment	
	Math	*Reading*	*Math*	*Reading*
New York Scholarship Program:				
Grade 2	0.15	0.12	0.21	0.17
Grade 3	-0.07	-0.07	-0.08	-0.09
Grade 4	0.21	0.10	0.27	0.12
Grade 5	0.16	0.23	0.18	0.27
Grades 4 & 5	0.18	0.14	0.23	0.18
All Grades	0.07	0.08	0.08	0.10
Tennessee School Size Study:				
Grade 1 (Stanford Achievement Test)			0.32	0.30
Grade 1 (Tenn. Basic Skills First Test)			0.15	0.25
Grade 2 (Stanford Achievement Test)			none[1]	none
Grade 2 (Tenn. Basic Skills First Test)			none	none
Grade 3 (Stanford Achievement Test)			none	none
Grade 3 (Tenn. Basic Skills First Test)			none	none

Effect sizes measured in standard deviations. Sources: see endnote 36.

[1] No significant incremental effects detected, positive or negative, beyond the first year.

Appendix

Computing Impacts of Being Offered a Scholarship

To compute the impact of being offered a scholarship we use a simple statistical model that includes as independent variables an indicator for treatment status (offered a scholarship or in the control group) and a set of indicators that show the stratum from which a family was selected; the stratum are based on (1) five discrete points at which families applied for scholarships, (2) whether a child attended a public school with below average achievement, and (3) the number of children within the family. When computing the impact on students= achievement test scores, we also included students= baseline reading and math achievement. Baseline test scores were included as predictors because of the small differences observed between students in the treatment group and the control group when comparing baseline characteristics. The basic form of the model is:

$$y_i = \beta_0 + \beta_1 T_i + X_i \beta_2 + \varepsilon_i$$

where T_i equals 1 if we offered a family a scholarship and 0 otherwise (families were randomly selected for the scholarship and control groups); X_i is a vector that includes indicator variables for each of the stratum used in the random selection of scholarship families and baseline test scores when computing impacts on achievement; y_i is the outcome of interest; ε_i is a random error term that captures the effects of unobserved factors that influence the outcome; and the β >s are parameters or vectors of parameters to be estimated. The parameter of most interest is β_1 because it shows the impact of being offered a scholarship on the outcome. We estimate the model parameters by using ordinary least squares.

Computing the Impacts of Program Participation

A simple comparison of an outcome for families in the scholarship group (those whom we offered a scholarship) and the control group shows the impact of *being offered a scholarship*, no matter whether a family sent their child to a private/parochial school or not. Our data show that about 20 percent of the families whom we offered a scholarship did not use one. To estimate the impact of taking a scholarship (attending a private school), we need to estimate a statistical model. The statistical model focuses on (1) the relationship between being offered a scholarship and taking the scholarship and (2) the relationship between taking the scholarship and family and student outcomes. These relationships can be expressed as:

$$p_i = \alpha_0 + \alpha_1 T_i + X_i \alpha_2 + \varepsilon_{pi}$$
$$y_i = \beta_0 + \beta_1 p_i + X_i \beta_2 + \varepsilon_{yi}$$

where T_i equals 1 if we offered a family a scholarship and 0 otherwise (families were randomly selected for the scholarship and control groups); X_i is a vector that includes indicator variables for each of the stratum used in the random selection of scholarship families and baseline test scores when computing impacts on achievement; p_i equals 1 if a family took a scholarship (attended a private school) and 0 otherwise; y_i is the outcome of interest; ε_{pi} and ε_{yi} are correlated random error terms that capture the effects of unobserved factors that influence both participation and the outcome; and α >s and β >s are parameters or vectors of parameters to be estimated. The parameter of most interest is β_1 because it shows the impact of taking a scholarship on the outcome. We estimate the model parameters by using instrumental variables. This technique allows us to compute asymptotically unbiased and efficient estimates of the parameters since it takes into account the presence of both measured and unmeasured factors that influence participation and the outcome (see Angrist, Imbens, and Rubin 1996). To implement the instrumental variables estimator, we first estimate the parameters of the participation equation with ordinary least squares and compute the predicted value of p_i. Next, we estimate the outcome equation with ordinary least squares and use the predicted value of p_i in place of the observed value.

In our tables we present (1) the average for each outcome for families in the scholarship group who took a scholarship and (2) the impact of taking a scholarship. In the text we also describe the average of outcomes for families in the control group who we would have expected to participate if we had given them the opportunity to receive a scholarship. The first quantity is easily obtained by computing the average for scholarship users and the impact is derived from the statistical model described previously. To compute the average for members of the control group who would have participated if given the opportunity to participate, we can use an alternative expression for computing the impacts of program participation (taking a scholarship):

$$E(y^T|p = 1) - E(Y^C|p = 1) = [E(y^T) - E(y^C)] / Pr(p = 1)$$

$$E(y^C|p = 1) = E(y^T|p = 1) - [E(y^T) - E(y^C)] / Pr(p = 1)$$

where $[E(y^T) - E(y^C)] / Pr(p = 1) = \beta_1$.[1] The last expression tells us that the outcome for controls, which is unobserved, can be computed from easily calculated quantities.

Adjusting Sample Weights for Non-Response

Families within the sample had different probabilities of being offered a scholarship. To reflect these differences in the probability of selection and to reflect the composition of the population of eligible applicants, we weight the sample data. The weights are constructed by taking the inverse of the probability of being selected for a scholarship. In this sample, the average weight was about 2.4. A family with a weight of 2.4 shows that this family is standing in for 1.4 other families in the pool of applicants as well as itself. The weights, which were adjusted for nonresponse at baseline and for the same family applying multiple times, range in size from about .5 to 15.[2]

About 17 percent of all families included in the first follow-up survey did not complete a survey form. Comparison of the characteristics of respondents and non-respondents suggest that the groups differ on a variety of dimensions including age of the students, parents= satisfaction with the schools they children attended when they applied for a scholarship, and the number of resources they had in the home. To adjust for this nonresponse we computed the probability of responding based on a logit model. The independent variables in the logit model included family characteristics, such as race/ethnicity, number of siblings, language spoken at home, mother=s education, and family income, and other variables used to stratify the sample when we collected the baseline data. Aftercomputing the predicted probability of responding, we adjusted the baseline weight as follows:

$$W_i=1/[f_i*p_i*pr_i]$$

where f_i includes the adjustment factors used for deriving the baseline weight, p_i is the probability of being selected for a scholarship (control group), pr_i is the probability of responding for the follow-up survey, and W_i is the new weight variable. Families that did not respond to the follow-up survey were assigned a weight of zero.

For the student data, we found that 76 percent of the students respond to the survey and that we had test scores for 78 percent of the students. To adjust the weights for the student level data, we followed the same procedures that were used for the parent data.

Baseline Characteristics for Treatment and Control Groups
(Mean Values Reported)

Variable	Control group	Test group	Difference	t-stat	Sig.
Grade of Student ('96-'97)					
Kindergarten	0.17	0.15	0.01	0.89	
First	0.20	0.18	0.02	0.95	
Second	0.22	0.21	0.01	0.34	
Third	0.22	0.24	-0.02	-1.17	
Fourth	0.20	0.21	-0.02	-0.87	
Years student attended this school	2.44	2.42	0.02	0.33	
Satisfaction with aspects of current school					
Location	2.93	3.01	-0.08	-2.05	*
School Safety	2.74	2.79	-0.05	-1.37	
Teaching	2.70	2.65	0.06	1.39	
How much school involves parents	2.70	2.71	-0.00	-0.14	
Class sizes	2.32	2.33	-0.01	-0.31	
School Facilities	2.62	2.60	0.02	0.52	
Student respect of teachers	2.85	2.88	-0.03	-0.73	
Parent-teacher communication	2.80	2.80	-0.01	-0.21	
Observation of religious traditions	2.30	2.25	0.05	1.16	
Student in gifted classes	0.13	0.12	0.01	0.62	
Student received help for disability	0.10	0.13	-0.03	-1.90	
Mother's educational expectations for child (10=some HS, 12=HS grad, 14=some college, 16=college grad, 18=more than college)	16.68	16.75	-0.06	-0.75	
Education level of mother or female guardian					
Some high school (did not graduate)	0.21	0.22	-0.01	-0.75	
High school graduate or GED	0.27	0.24	0.02	1.01	
Some college	0.41	0.41	0.00	0.09	
Graduated from 4-year college	0.07	0.08	-0.00	-0.36	
More than 4-year college degree	0.03	0.03	0.00	0.52	
Don't know	0.01	0.02	-0.01	-1.50	
Race/ethnicity of mother/female guardian					
White	0.05	0.06	-0.01	-0.60	
Black	0.44	0.46	-0.02	-0.77	
Puerto Rican	0.19	0.18	0.01	0.83	
Hispanic other than Puerto Rican	0.27	0.26	0.01	0.72	
Other	0.04	0.05	-0.01	-0.59	
Birth place of mother/female guardian					
Born in United States	0.62	0.60	0.02	0.89	
Born in Puerto Rico	0.08	0.07	0.00	0.33	
Born outside U.S. and Puerto Rico	0.30	0.33	-0.03	-1.18	

Variable	Control group	Test group	difference	t-stat	Sig.
Length of residence of mother in months	35.50	36.03	-0.53	-0.93	
Job status of mother/female guardian					
Full-time job	0.21	0.22	-0.00	-0.24	
Part-time job	0.15	0.16	-0.01	-0.45	
Not working now but looking for work	0.47	0.47	0.00	0.07	
Not working and not looking for work	0.15	0.15	0.01	0.51	
Don't know	0.01	0.01	0.00	0.40	
Religious affiliation of female guardian					
Catholic	0.49	0.51	-0.02	-0.74	
Religion other than Catholic	0.44	0.44	0.00	0.09	
None	0.06	0.05	0.02	1.41	
Number of children in home	2.38	2.39	-0.01	-0.09	
In child's home (percent saying yes):					
A daily newspaper	0.84	0.85	-0.01	-0.79	
An encyclopedia	0.70	0.71	-0.01	-0.40	
A dictionary	0.98	0.97	0.01	1.56	
More than 50 books	0.85	0.85	0.00	0.09	
Member of household receiving assistance:					
Food stamps	0.66	0.66	0.00	0.15	
Welfare	0.57	0.57	0.00	0.09	
Social Security	0.12	0.12	0.00	0.20	
Medicaid	0.66	0.63	0.03	1.24	
Supplemental Security Income	0.12	0.14	-0.02	-1.36	
Family income	9,457.44	9,555.95	-98.51	-0.29	
Reading scores adjusted for grade level	27.40	22.52	4.88	3.20	*
Math scores adjusted for grade level	20.23	16.87	3.36	2.35	*
English spoken at home	0.75	0.78	-0.03	-1.45	

[1] This expression for program impacts draws on Bloom=s earlier work (1984).

[2] The weights also were divided by 2 so that they would sum to the size of the population we are trying to represent and not twice the population (scholarship families sum to half the population total and control families sum to half the population total).